



Complete Summary

TITLE

Accidental puncture or laceration: rate per 1,000 eligible discharges.

SOURCE(S)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. various p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Measure Domain

PRIMARY MEASURE DOMAIN

Outcome

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the [Measure Validity](#) page.

SECONDARY MEASURE DOMAIN

Does not apply to this measure

Brief Abstract

DESCRIPTION

This measure is used to assess the number of cases of technical difficulty (e.g., accidental cut or laceration during procedure) per 1,000 eligible discharges.

RATIONALE

This indicator is intended to track injuries occurring during a procedure, specifically accidental cut, puncture, perforation, or laceration. These procedures may be prevented through proper technique during procedures.

PRIMARY CLINICAL COMPONENT

Accidental cut; puncture; perforation; laceration

DENOMINATOR DESCRIPTION

All surgical and medical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs)

Exclude cases:

- with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code denoting technical difficulty (e.g., accidental cut, puncture, perforation, or laceration) in the principal diagnosis field
- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)
- normal newborn (DRG 391)
- neonates with a birth weight less than 500 grams

Note: Refer to the original measure documentation for specific DRG and ICD-9-CM codes.

NUMERATOR DESCRIPTION

Discharges among cases meeting the inclusion and exclusion rules for the denominator with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code denoting accidental cut, puncture, perforation or laceration during a procedure in any secondary diagnosis field

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Evidence Supporting the Measure

EVIDENCE SUPPORTING THE CRITERION OF QUALITY

- A formal consensus procedure involving experts in relevant clinical, methodological, and organizational sciences
- One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Evidence Supporting Need for the Measure

NEED FOR THE MEASURE

Variation in quality for the performance measured

EVIDENCE SUPPORTING NEED FOR THE MEASURE

Agency for Healthcare Research and Quality (AHRQ). National healthcare quality report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003.

Miller MR, Zhan C. Pediatric patient safety in hospitals: a national picture in 2000. *Pediatrics* 2004 Jun;113(6):1741-6. [32 references] [PubMed](#)

Sedman A, Harris JM 2nd, Schulz K, Schwalenstocker E, Remus D, Scanlon M, Bahl V. Relevance of the Agency for Healthcare Research and Quality Patient Safety Indicators for children's hospitals. Pediatrics 2005 Jan;115(1):135-45. [17 references] [PubMed](#)

State of Use of the Measure

STATE OF USE

Current routine use

CURRENT USE

Internal quality improvement
Quality of care research

Application of Measure in its Current Use

CARE SETTING

Hospitals

PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Physicians

LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Single Health Care Delivery Organizations

TARGET POPULATION AGE

Age less than 18 years

TARGET POPULATION GENDER

Either male or female

STRATIFICATION BY VULNERABLE POPULATIONS

Stratify rates by low birth weight neonate (under 2000 grams) and other patients.

Characteristics of the Primary Clinical Component

INCIDENCE/PREVALENCE

Surgeries in pediatric patients, because of their smaller anatomy, can be technically more complex and can carry a high risk of accidental puncture or

laceration (e.g., 2.22 per 1,000 discharges at 0 to 17 years, 1.84 at 18 to 44 years, 2.82 at 45 to 64 years, and 3.47 at 65 or more years). This indicator was investigated by two groups, although the definition differed slightly from the definition proposed for this measure. Miller and colleagues analyzed Healthcare Cost and Utilization Project (HCUP) data in 2000, using a publicly released version of this indicator applied to a pediatric population, and found a significant incidence of accidental puncture or laceration in pediatric patients (1.0 per 1,000 in 2000 among 0 to 18 year old children). Additionally, Miller & Zhan found that this error resulted in increased mean length of stay (by 7.7 days) and charges per stay (\$41,204 on average) in affected patients, with 2.7 times higher odds of in-hospital mortality (after adjusting for age, gender, expected payer, up to 30 comorbidities, and multiple hospital characteristics, including ownership, teaching status, nursing expertise, urban location, bed size, pediatric volume, coding intensity, intensive care unit (ICU) bed percentage, and surgical discharge percentage). Sedman et al. found observed rates varying from 1.7 per 1,000 in 1999 to 1.9 per 1,000 in 2002 in the National Association of Children's Hospitals and Related Institutions (NACHRI) database (i.e., a slight upward trend over time), when applying the publicly released Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) definition to a pediatric population.

EVIDENCE FOR INCIDENCE/PREVALENCE

Agency for Healthcare Research and Quality (AHRQ). National healthcare quality report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003.

Miller MR, Zhan C. Pediatric patient safety in hospitals: a national picture in 2000. *Pediatrics* 2004 Jun;113(6):1741-6. [32 references] [PubMed](#)

Sedman A, Harris JM 2nd, Schulz K, Schwalenstocker E, Remus D, Scanlon M, Bahl V. Relevance of the Agency for Healthcare Research and Quality Patient Safety Indicators for children's hospitals. *Pediatrics* 2005 Jan;115(1):135-45. [17 references] [PubMed](#)

ASSOCIATION WITH VULNERABLE POPULATIONS

See the "Incidence/Prevalence" field.

BURDEN OF ILLNESS

Unspecified

UTILIZATION

See the "Incidence/Prevalence" field.

COSTS

See the "Incidence/Prevalence" field.

Institute of Medicine National Healthcare Quality Report Categories

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

Safety

Data Collection for the Measure

CASE FINDING

Users of care only

DESCRIPTION OF CASE FINDING

All surgical and medical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs) (see the "Denominator Inclusions/Exclusions" field)

DENOMINATOR SAMPLING FRAME

Patients associated with provider

DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions

All surgical and medical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs)

Exclusions

Exclude cases:

- with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code denoting technical difficulty (e.g., accidental cut, puncture, perforation, or laceration) in the principal diagnosis field
- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth and puerperium)
- normal newborn (DRG 391)
- neonates with a birth weight less than 500 grams

Note: Refer to the original measure documentation for specific DRG and ICD-9-CM codes.

RELATIONSHIP OF DENOMINATOR TO NUMERATOR

All cases in the denominator are equally eligible to appear in the numerator

DENOMINATOR (INDEX) EVENT

Clinical Condition
Institutionalization
Therapeutic Intervention

DENOMINATOR TIME WINDOW

Time window is a single point in time

NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions

Discharges among cases meeting the inclusion and exclusion rules from the denominator with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code denoting accidental cut, puncture, perforation or laceration during a procedure in any secondary diagnosis field

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Exclusions

Unspecified

MEASURE RESULTS UNDER CONTROL OF HEALTH CARE PROFESSIONALS, ORGANIZATIONS AND/OR POLICYMAKERS

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

NUMERATOR TIME WINDOW

Institutionalization

DATA SOURCE

Administrative data

LEVEL OF DETERMINATION OF QUALITY

Not Individual Case

OUTCOME TYPE

Adverse Outcome

PRE-EXISTING INSTRUMENT USED

Unspecified

Computation of the Measure

SCORING

Rate

INTERPRETATION OF SCORE

Better quality is associated with a lower score

ALLOWANCE FOR PATIENT FACTORS

Analysis by high-risk subgroup (stratification on vulnerable populations)
Analysis by subgroup (stratification on patient factors, geographic factors, etc.)
Case-mix adjustment
Risk adjustment method widely or commercially available

DESCRIPTION OF ALLOWANCE FOR PATIENT FACTORS

Risk adjustment of the data is recommended using, at minimum, age, sex, and 3M™ All-Patient Refined Diagnosis-Related Groups (APR-DRGs)*.

Application of multivariate signal extraction (MSX) to smooth risk adjusted rates is also recommended.

Additionally, for this measure:

Stratify rates by low birth weight neonate (under 2000 g) and other patients.

Risk adjust rates by procedure type recorded in patient record:

- i. no therapeutic
- ii. minor therapeutic
- iii. one major therapeutic without diagnostic
- iv. one major therapeutic with minor diagnostic
- v. one major therapeutic with major diagnostic
- vi. two major therapeutic
- vii. three or more major therapeutic

Stratify rates by clinical category:

- i. Eye, ear, nose, mouth, throat, skin, breast, and other low-risk procedures
- ii. Thoracic, cardiovascular, and specified neoplastic procedures
- iii. Kidney, and male/female reproductive procedures
- iv. Infectious, immunological, hematological, and ungroupable procedures
- v. Trauma, orthopedic, and neurologic procedures
- vi. Gastrointestinal, hepatobiliary, and endocrine procedures

***Note:** Information on the 3M™ APR-DRG system is available at http://www.3m.com/us/healthcare/his/products/coding/refined_drq.jhtml.

STANDARD OF COMPARISON

Internal time comparison

Evaluation of Measure Properties

EXTENT OF MEASURE TESTING

The development of the Agency for Healthcare Research and Quality (AHRQ) Pediatric Quality Indicators utilizes a four pronged approach: identification of candidate indicators, literature review, empirical analyses, and panel review. Candidate indicators were identified through both published literature and a brief survey of national organizations. Literature review provided descriptions and evaluations of some candidate indicators and the underlying relationship to quality of care. Empirical analyses were conducted to explore alternative definitions; to assess nationwide rates and hospital variation; and to develop appropriate methods to account for variation in risk. Clinical panel review helped to refine indicator definitions and risk groupings, and to establish face validity in light of the limited evidence from the literature for most pediatric indicators. Information from these sources was used to specify indicator definitions and make recommendations to AHRQ regarding the best indicators for inclusion in the pediatric indicator set.

A structured review of each indicator was undertaken to evaluate face validity (from a clinical perspective). This process mirrored that undertaken during the initial development of the Patient Safety Indicators. Specifically, the panel approach established *consensual validity*, which "extends face validity from one expert to a panel of experts who examine and rate the appropriateness of each item...." The methodology for the structured review was adapted from the RAND/UCLA Appropriateness Method and consisted of an initial independent assessment of each indicator by clinician panelists using an initial questionnaire, a conference call among all panelists, followed by a final independent assessment by clinician panelists using the same questionnaire. The panel process served to refine definitions of some indicators, add new measures, and dismiss indicators with major concerns from further consideration.

Empirical analyses were conducted to provide the clinical panels and peer review participants with additional information about the indicators. These analyses were also used by the development team to test the alternative specifications and the relative contribution of indicator components in the numerator and denominator. These analyses were not intended to inform issues of precision, bias and construct validity, which will be addressed separately. The data source used in the empirical analyses was the 2003 Kids' Inpatient Sample (KID).

Refer to the original measure documentation for additional details.

EVIDENCE FOR RELIABILITY/VALIDITY TESTING

Fitch K, Bernstein SJ, Aguilar MD, et al. The RAND/UCLA appropriateness method user's manual. Santa Monica (CA): RAND; 2001. 109 p.

Green L, Lewis F. Measurement and evaluation in health education and health promotion. Mountain View (CA): Mayfield Publishing Company; 1998.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Identifying Information

ORIGINAL TITLE

Accidental puncture or laceration (PDI 1).

MEASURE COLLECTION

[Agency for Healthcare Research and Quality \(AHRQ\) Quality Indicators](#)

MEASURE SET NAME

[Agency for Healthcare Research and Quality \(AHRQ\) Pediatric Quality Indicators](#)

DEVELOPER

Agency for Healthcare Research and Quality

ENDORSER

National Quality Forum

ADAPTATION

This measure was adapted from the AHRQ Patient Safety Quality Indicators.

PARENT MEASURE

Accidental Puncture or Laceration, Provider Level (PSI 15) (Agency for Healthcare Research and Quality [AHRQ])

RELEASE DATE

2006 Feb

REVISION DATE

2007 Mar

MEASURE STATUS

This is the current release of the measure.

SOURCE(S)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. various p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

MEASURE AVAILABILITY

The individual measure, "Accidental Puncture or Laceration (PDI 1)," is published in "Measures of Pediatric Health Care Quality Based on Hospital Administrative Data: The Pediatric Quality Indicators" and "AHRQ Quality Indicators. Pediatric Quality Indicators: Technical Specifications [version 3.1]." These documents are available in Portable Document Format (PDF) from the [Pediatric Quality Indicators Download](#) page at the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Web site.

For more information, please contact the QI Support Team at support@qualityindicators.ahrq.gov.

COMPANION DOCUMENTS

The following are available:

- AHRQ quality indicators. Pediatric quality indicators: software documentation [version 3.1] - SAS. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 42 p. This document is available in Portable Document Format (PDF) from the [AHRQ Quality Indicators Web site](#).
- AHRQ quality indicators. Software documentation: Windows [version 3.1a]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Apr 6. 99 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Pediatric quality indicators (PedQI): covariates [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 52 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Pediatric quality indicators (PedQI): covariates (with POA) [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 52 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- HCUPnet. [internet]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 [accessed 2007 May 21]. [Various pagings]. HCUPnet is available from the [AHRQ Web site](#). See the related [QualityTools](#) summary.

NQMC STATUS

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